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BIOLOGICAL EVALUATION Chihuahua Pine Mortality

John Hands and Herb Martyr
Recreational Areas
Douglas Ranger
District
Coronado
National
Forest
Arizona

Branch of Forest Insect and Disease Management Division of Timber Management Southwestern Region, USDA, Forest Service 517 Gold Avenue, SW Albuquerque, New Mexico 87102

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Prepared by:

ROBERT E. ACCIAVATTI, Entomologist

Branch of Forest Insect and Disease Management

APPROVED BY:

DONALD P. GRAHAM. Chief

Branch of Forest Insect and Disease Management

MARK M. JOHANNESEN

Assistant Regional Forester

## INTRODUCTION

Chihuahua pine mortality was first noted along upper Cave Creek Canyon in the Chiricahua Mountains, southwest of Portal, Arizona, several years ago. This mortality was attributed to the Chihuahua pine dwarf mistletoe and severe drought conditions. The dying pines are located in the vicinity of two recreation areas, the John Hands and the Herb Martyr. On April 8, 1974, the author, accompanied by Rafael Velasco and Louis Pope, Douglas Ranger District, evaluated the present situation in upper Cave Creek Canyon.

Dwarf mistletoe was present in all dying pines examined. The Arizona five-spined ips was also found attacking several of these trees. The potential exists for this beetle developing an outbreak in the canyon and killing many aesthetically valuable trees in the recreation areas. Removal of beetle-infested trees and pruning dwarf mistletoe-infected ones within the recreation areas are recommended to reduce this potential.

# TECHNICAL INFORMATION

<u>Disease</u>.--Chihuahua pine dwarf mistletoe, <u>Arceuthobium gillii</u> Hawksworth & Wiens subsp. gillii.

Insect .-- Arizona five-spined ips, Ips lecontei Swaine.

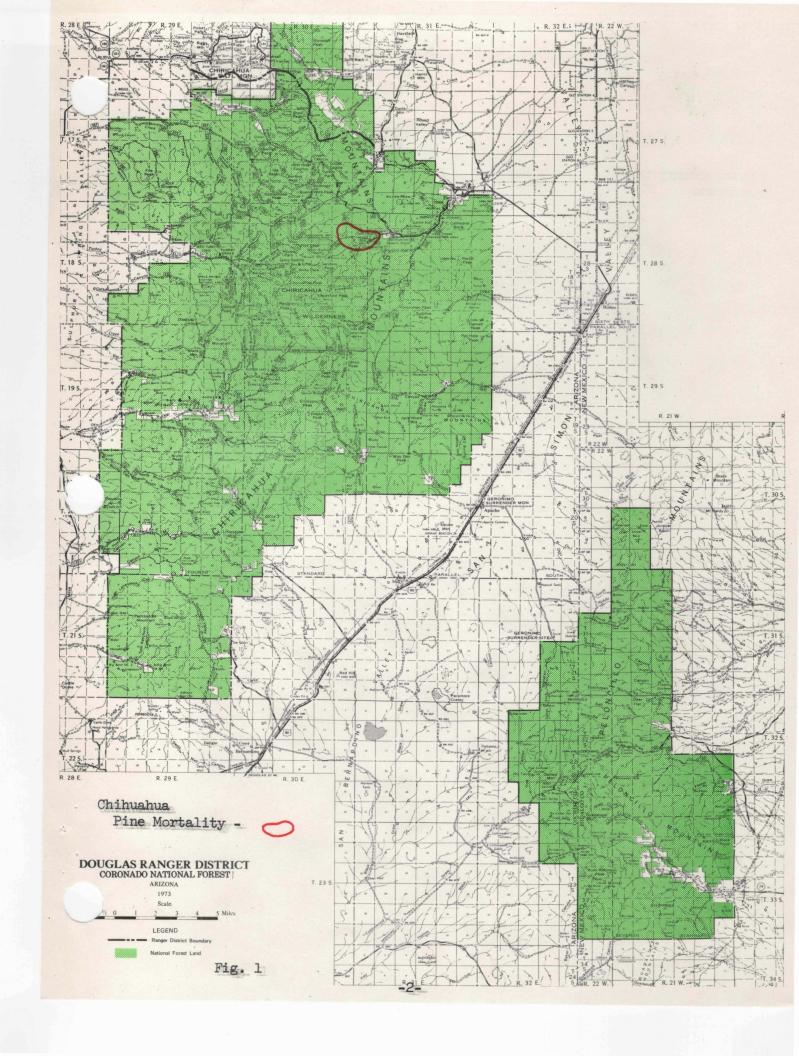
Host. -- Chihuahua pine, Pinus leiophylla Schiede & Deppe var. chihuahuana (Engelm.) Shaw.

Extent and Location of Damage. -- The problem area is located in upper Cave Creek Canyon, about 6 miles southwest of Portal, Arizona (Fig. 1). Trees are dying singly and in small groups throughout an estimated 1,000 acres of host type in Sections 11, 12, 13, and 14, in Township 18 South, Range 30 East, Gila and Salt River Meridian.

#### METHODS

Visual observations were made at random in John Hands and Herb Martyr Recreation Areas, along Forest Road 42A and around the end of this road. About 20 dying trees were examined. Each tree was rated for Chihuahua pine dwarf mistletoe, using the 6-class mistletoe rating

<sup>1/</sup> Loomis, R. C. 1971. Disease detection survey, air pollution, Coronado National Forest, Arizona. USDA, Forest Serv., Reg. 3. 12 p. (Unpublished office report).



system. 2 Chihuahua pine is the only presently known host for this species of dwarf mistletoe in the United States. 3 Bark samples were removed from these same trees and examined for bark beetles. The beetles were collected and taken to the Albuquerque laboratory for identification.

#### RESULTS AND DISCUSSION

Dying Chihuahua pine was found over an extensive area west and north of the recreation areas. The pine mortality is most abundant at midslopes where the trees are growing on alluvial fans entering the canyon (Fig. 2 and 3). Since the deep, gravelly soils developed on these slopes do not retain water for long periods, trees growing there may be severely weakened during prolonged droughts. Drought conditions have persisted in the problem area for the last several years. Chihuahua pine dwarf mistletoe was found to be widespread and abundant on all dying trees observed (Fig. 4). Every dying tree examined had a dwarf mistletoe rating of either 5 or 6.

Several dying trees were infested with the Arizona five-spined ips. This insect normally breeds in slash and felled trees, but will attack standing trees weakened by drought or dwarf mistletoe. When large populations build up in dead or weakened material, adjacent living trees can be killed. This is especially true if the attacked trees are under stress, as they do not have enough resin flow to pitch out attacking beetles. Populations of this bark beetle will continue to increase in this area without natural controls.

Additional tree mortality can be expected in upper Cave Creek Canyon, even if drought conditions should diminish and the trees remain free of ips beetle attacks. Several years probably will be required for the trees to recover after the drought, and the high incidence of dwarf mistletoe infection will continue to keep many trees in a state of low vigor.

### RECOMMENDATIONS

The presence of ips beetles in dying trees poses an immediate threat to healthy trees in the area. Where these dying trees are in the recreation areas or along travel influence zones, they should be

<sup>2/</sup> Hawksworth, F. G. 1961. Dwarfmistletoe of ponderosa pine in the Southwest. USDA Tech. Bull. 1246. 112 p., illus.
3/ Hawksworth, F. G., and D. Wiens. 1972. Biology and classification of dwarf mistletoes (Arceuthobium). USDA Agr. Handbook No. 401. 234 p., illus.



Fig. 2.--Dying Chihuahua pines on alluvial fan entering upper Cave Creek Canyon.



Fig. 3.--Dying Chihuahua pines at midslopes of upper Cave Creek Canyon.



Fig. 4.--Dying Chihuahua pine with a class 6 dwarf mistletoe rating.

treated to reduce this threat. We recommend felling the infested trees, piling them in open areas, and covering the pile with 4-mil clear polyethylene sheeting. 4 The piles should be located where the full sunlight will hit them most of the day. All protruding branches should be trimmed off to prevent snagging the plastic. The edges of the plastic should be buried to maintain lethal bark temperatures within the pile. Each pile must be covered for at least 4 weeks.

The widespread occurrence of Chihuahua pine dwarf mistletoe in the canyon poses a continuing threat to all host trees in the area. Infection centers will slowly increase and trees within the centers will become more heavily parasitized. The vigor of heavily infected trees is reduced and they become more susceptible to drought stress. Pruning the dwarf mistletoe-infected branches from trees in the recreation areas and along the travel influence zone will increase tree vigor and prolong the life of trees in these areas.

Forest insect and disease suppression funds are available to help finance removal and treatment of ips beetle-infested trees and pruning dwarf mistletoe-infected branches. Removal of dead and dying trees which represent a potential fire and recreation hazard in the developed recreational areas can also be financed with these funds. If pest control funds are used, a cost-benefit evaluation and environmental impact evaluation should accompany the project proposal. Our forest pest management personnel are available to assist in the preparation of these documents and the operational phases of the suppression project, should one be undertaken. Our entomologists will revisit the area later this summer to evaluate the course of the ips beetle problem and advise you of the situation.

#### ACKNOWLEDGMENT

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<sup>4/</sup> Buffam, P. E., and D. D. Lucht. 1968. Use of polyethylene sheeting for control of Ips spp. in logging debris. J. Econ. Entomol. 61: 1465-6.